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(54) POURABLE MARGARINES HAVING IMPROVED STABILITY AGAINST OIL AND WATER SEPARATION

(71) UNILEVER LIMITED, a company organised under the laws of Great Britain, of Unilever House, Blackfriars, London, E/C 4, England, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to pourable margarines having improved stability against oil and water separation. In particular the invention relates to pourable margarines free from solid fats and to a process for the preparation of such margarines.

Conventional margarine is usually plastic at ambient temperature. This plasticity is mainly attributable to the nature of the fatty phase of the water-in-oil emulsion constituting margarine, in particular to the presence of substantial proportions of fatty matter which exist in the solid state at ambient temperature, but also to a great extent to the presence of emulsifiers.

Such margarines contain from about 10—25% by weight of an aqueous phase and about 90—75% of a fatty phase, more particularly about 80% of a fat or fat blend, 16% of an aqueous phase, and minor proportions of flavours, emulsifiers, preserving agents etc.

It is generally accepted that the glyceride crystals of the fatty matter in plastic margarines are present as a three-dimensional solid network in which liquid oils and droplets of the aqueous phase are enclosed and this arrangement forms an important contribution to the stability of such margarines against oil separation.

Attempts have been made to prepare margarines with a proportion of aqueous phase similar or equal to that present in plastic margarines, which margarines are pourable at ambient temperature and preferably also at refrigeration temperatures, but which are nevertheless similarly stable against oil separation. The requirement for pourability, however, sets a limit to the amount of hard fat that can

be incorporated in such compositions. The maximum hard fat content in the fatty phase in pourable margarine is dependent on several factors, e.g. the viscosity of the margarine required at storage and use conditions, the type, melting point and particle size of the hard fat used and the process conditions under which the product is prepared. It is generally found, however, that the maximum allowable amount of hard fat in pourable margarines is not sufficient to arrive at a product which is sufficiently stable against oil separation, especially not at relatively high use temperatures, e.g. 20° to 35°C. It has now been found that the stability against oil separation of a pourable margarine of the water-in-oil type at said temperatures can be improved by incorporating in the fatty phase of said margarine a minor amount of an ester of a polycondensed polyhydric alcohol and a polycondensed aliphatic hydroxycarboxylic acid.

Particularly the invention relates to a pourable margarine comprising 10 to 25% by weight of an aqueous phase and 90 to 75% by weight of a fatty phase, said fatty phase comprising a liquid oil which is pourable at all temperatures from 5 to 35°C, especially from 0 to 35°C, and 0.5—2.5% by weight of the fatty phase of a surface-active agent prepared by reacting 80—92 parts by weight of a polycondensed aliphatic hydroxymonocarboxylic acid initially having 12 to 20 carbon atoms, which polycondensate has an acid number not in excess of 70, with 8—20 parts by weight of a polycondensed aliphatic polyhydric alcohol initially having 3 to 6 carbon atoms, at a temperature in the range of 180°C to 210°C, until the acid value of the reaction mixture drops to below 10.

The pourable margarines of the invention can contain any convenient ingredient for such product, e.g. vitamins, colouring agents and mono-diglycerides, especially in liquid form, and a minor amount of said reaction product, which reaction product contains a partial ester ether.

For the purpose of this specification these reaction products are called "the surface-active agents".

The compounds obtained by polycondensation of hydroxycarboxylic acids are known as "estolides".

The term "polycondensation" as used herein means a reaction in which a number of molecules of the same compound combine to form larger molecules while the water is eliminated.

In order to obtain the desired products, it is necessary that the hydroxymonocarboxylic acids are polycondensed before esterification with a polycondensed polyhydric alcohol. The surface-active agent used in the product of the invention may be prepared from either saturated hydroxymonocarboxylic acids having from 12 to 20 carbon atoms and particularly those having at least 16 carbon atoms.

The hydroxymonocarboxylic acid should preferably contain one or two hydroxy groups but can contain three or four hydroxy groups. In the case of saturated acids, the number of hydroxy groups may be five or even six.

Ricinoleic acid, mono- or dihydroxystearic acid or a mixture containing these acids, such as the castor oil fatty acids, is preferred. Other hydroxy acids which may be used are the dihydroxy acid obtained by oxidation of palmitoleic acid, the tetrahydroxy acid obtained by oxidation of linoleic acid and the hexahydroxy acid obtained by oxidation of linolenic acid or oleostearic acid. Wholly synthetic hydroxy acids may also be used.

The polyvalent alcohols to be used for the preparation of the surface-active agent of the product of the invention, contain between 3 and 6 carbon atoms.

Suitable polycondensates of polyvalent alcohols containing at least three carbon atoms include polyglycerols, polyerythritols, polypentacrythritols and polymannitols; of these polyglycerols are preferred. The polycondensation of the polyhydric alcohols can be continued until the final polycondensate has from 6 to 18 carbon atoms. A suitable polycondensate of polyvalent alcohol is polyglycerol having the mean composition of triglycerol ($N_d^{85} = 1.4800$).

The surface-active agents can be prepared by the process described in British patent specification 723,244.

It is a great advantage of the products of the invention that they are not only excellently stable against oil separation at temperatures of up to at least 35°C, but that they also show a significant reduction in spattering behaviour during frying.

Another great advantage of the products of the invention is that they can be prepared from an oil phase which is free from emulsion stabilizing proportions of hard fats, which fats have hitherto been regarded to be essential for at least partly stabilizing the pourable mar-

garines against oil separation. The preferred margarines of the invention therefore have a better pourability, especially at low temperatures, e.g. refrigeration temperature, than those containing hard fat.

It is further an advantage that the pourable margarine can be prepared without using the commonly applied margarine preparative techniques, but instead by applying simple and commercially available emulsifying equipment.

More particularly the invention relates to pourable margarines containing the above-mentioned surface-active agent together with a hydrophilic emulsifier. As opposed to the surface-active agent the hydrophilic emulsifier is preferably present in the aqueous phase. Various hydrophilic emulsifiers can be used, e.g. sodium and potassium salts of fatty acids, especially unsaturated fatty acids, such as oleic acid, a phosphatide and especially a phosphatide of which preferably from 5—35% by weight is a monoacylglycerophosphatide. The phosphatides improve the quality of the gravy prepared from the liquid margarines of the invention and usually they also further improve the stability of the emulsion against oil and water separation, especially when the aqueous phase of the emulsion contains or consists of skim milk.

Monoacylglycerophosphatides lack one of either the α - or β -acyl groups of diacylglycerophosphatides, and typical of them are α - and β -lysolecithin and α - and β -lysocephalin. Monoacylglycerophosphatides can be prepared by synthesis or they can be obtained by the chemical hydrolysis (see e.g. British Patent Specification No. 1229430) or the enzymatic partial hydrolysis of diacylglycerophosphatides. α -Monoacylglycerophosphatides can be prepared by the action on diacylglycerophosphatides of the enzyme phospholipase A (lecithinase A), which is conveniently prepared free of other enzymes by the partial heat inactivation of pancreatin. For this an aqueous suspension of pancreatin can be heated to from 70°C to 80°C for 30 minutes or to 90°C for 10 minutes. The phosphatide used for the hydrolysis can be a phosphatide slime obtained in the production of plant oils, for example soybean oil or rapeseed oil, and steam or water treatment of the extracted oils at 95°C to 100°C, or the crude phosphatide obtained by centrifuging such a phosphatide slime and drying the product under reduced pressure: a typical crude phosphatide thus obtained contains about 65% diacylglycerophosphatides and 35% oil.

In preparing an α -monoacylglycerophosphatide by enzymatic hydrolysis of such a phosphatide the latter is dissolved or suspended in water, or a solvent containing sufficient water, with from 0.1 to 25% of heat-treated pancreatin by weight of the phosphatide, and hydrolysis allowed to proceed at ambient temperature until a sufficient concentration of the monoacyl compound has been formed. Pre-

ferably the water contains calcium ions and tap water of 5 to 30°C hardness is suitable. Fatty acid produced and contaminated fat can subsequently be removed by drying the product, for instance by evaporation under reduced pressure, and extracting it with acetone. A phosphatide containing from 5 to 45% of monoacylglycerophosphatide, depending on the degree of hydrolysis effected, can be obtained in this way. Especially those products containing 5—35%, preferably 10—25% of monoacylglycerophosphatide, are suitable for the purpose of the invention. The amount of monoacylglycerophosphatide in the product of hydrolysis can be determined by standard analytical methods, for instance thin-layer chromatography.

In practice the fatty acid acyl group of the monoacylglycerophosphatide has from 12 to 24 carbon atoms, and the monoacylglycerophosphatide has from 12 to 24 carbon atoms, and the monoacylglycerophosphatide produced from a natural phosphatide will generally have its monoacyl group derived from mixed fatty acids, especially those of 16 and 22 carbon atoms. Preferably the monoacylglycerophosphatide comprises lysolecithin and lyscephalin.

In preparing the pourable margarines a sufficient amount of the surface-active agent is incorporated in the fatty phase to obtain the stability required: the amount used is generally within the range of from 0.5 to 2.5% by weight of the fatty phase; normally from 0.75 to 1.5% is suitable.

The liquid oil in the pourable margarine of the invention preferably is pourable at all temperatures from 0 to 35°C.

Since margarines containing a high content of polyunsaturated fatty acids, notably those known as essential fatty acids, are widely believed to be dietetically beneficial, it is preferred that liquid vegetable oils containing at least 40% of polyunsaturated fatty acids are used for the purpose of the invention, e.g. sunflower, safflower, soybean, wheat germ, grape-seed, poppyseed, tobacco seed, rye, walnut or corn oil.

Although pourable margarines free from

emulsion stabilizing proportions of hard fats are preferred, at least as far as the stability against oil separation of the products of the invention is concerned, nevertheless sufficiently stable emulsions can be prepared containing hard fat, provided that not less than 2.5% of hard fat, calculated on the fat phase, is used otherwise destabilisation of the emulsion occurs almost immediately after storage at 35°C. Such hard fats can improve e.g. the creaming properties of the pourable margarine, which can be of importance when the margarine is used for baking purposes.

Suitable hard fats include hydrogenated soyabean oil, rapeseed oil, groundnut oil etc. of a slip melting point of 50—75°C.

The expression "aqueous phase" as used in this specification refers to water or to water containing the usual water-soluble additives solubilized therein, which is the minor phase of the margarines of the invention.

The aqueous phase can contain water, salt, potassium sorbate, flavour, ground soybeans, or milk in the form of whole milk, cream, skim milk, or reconstituted skim milk.

Both distilled and tap water can be used. Especially when milk solids are present in the aqueous phase of the margarine of the invention it is of advantage to incorporate the surface-active agent in the fatty phase and the hydrophilic emulsifier, especially those containing monoacylglycerophosphatides in the aqueous phase.

Suitable proportions of hydrophilic emulsifier are from 0.3 to 6%, preferably from 0.5—3.5%, of the aqueous phase.

Particularly an aqueous phase is preferred containing, apart from various minor ingredients e.g. common salt, flavours, emulsifiers, preserving agents and vegetable protein, a substantial proportion of water, i.e. either distilled or tap water. More particularly said aqueous phase contains from 50—100% of water, since liquid margarines prepared therefrom are astonishingly stable at temperatures up to 35°C.

Some suitable compositions for the aqueous phase to which preferably hydrophilic emulsifiers are added are set forth in the following table.

	Range ^(a)	1	2	3	4	5
Salt	0—4	1.75	4.0	1.75	—	2.0
Skim milk	0—19.7	—	—	—	—	9.0
Skim milk solids	0—2	1.63	—	—	1.80	—
Water (tap and/or distilled)	0—19.7	16.30	15.77	16.30	17.87	9.0
K-sorbate	0—0.1	0.10	—	0.10	0.10	0—0.1
Flavour	0—0.3 0	0.03	0.03	0.03	0.03	0—0.03
Ground soybeans	0—2	—	—	1.63	—	—
EDTA ^(b)	0—75 ppm	—	75ppm	—	—	—

(a) to a total of 19.7 to 20 parts

(b) disodium calcium ethylenediaminetetraacetate.

5 It is an advantage of the product of the invention that owing to emulsification properties of the surface-active agent the aqueous phase is so finely dispersed that hardly any bacteriological problems occur even if the pourable margarine has an alkaline.

10 If desired, the aqueous phase or the emulsion formed can be made acid to the required pH with lactic, citric, or other suitable acid, or by the action of bacteria, for instance with the addition of 0.5 to 1% of lactic acid culture where the appropriate bacterial substrate is present. Preferably the pH of the emulsion

15 is from 4 to 7.
Excellent pourable margarines have been prepared, the fatty phases of which consist of sunflower oil, groundnut oil or safflower oil, 0.75 to 1.5% by weight of fat phase of surface-active agent, an aqueous phase of 40—60 parts by weight of the tap water, and 60—40 parts by weight of soured skim milk together with 1.5 to 2.5% by weight of the aqueous phase of monoacylglycerophosphatides and from 0.1 to 0.5% by weight of the aqueous phase of potassium oleate.

20 The pourable emulsions of the present invention can be used for the preparation of foodstuffs, e.g. soups, sauces, stews, gratinated dishes and sandwiches, and especially for frying and baking purposes.

25 The product of the invention can be prepared by conventional emulsion preparative techniques. Care should be taken, however, that the aqueous phase is dispersed in the fatty phase in such a way that at least 80% of the dispersed droplets have a particle size of at most 10 microns. Preferably the emulsification is effected in such a way that at least 90% of the dispersed droplets have a particle size of from 2 to 8 microns. The pourable mar-

garine can also be prepared by conventional margarine preparative techniques, for example by the use of a scraped surface heat exchanger such as a Votator (Votator is a registered Trade Mark). In such apparatus the blend of oil phase and aqueous phase, including such additives as are customary in the preparation of margarine, for example flavouring agents and colouring matter, are simultaneously blended and chilled, e.g. to from 0° to 20°C. Further details of this preparative method appear in "Margarine" by Anderson & Williams, Pergamon Press, London, 1954, pages 228 et seq.

The emulsion obtained can be stored without subsequent cooling and tempering treatment.

The invention is illustrated by the following Examples: in which all percentages are by weight and are based on the fat phase, except for the percentage of hydrophilic emulsifier, which is based on the aqueous phase and the percentage of salt which is based on the total product.

EXAMPLES I AND II.

65 The preparation of a partial polyglycerol ester of polyricinoleic acid

A mixture of fatty acids (acid value 170) prepared by saponifying castor oil is heated to between 200°C and 210°C at a reduced pressure for 16 hours. Nitrogen at a reduced pressure is passed through the mixture during the heating which is continued until the acid value falls to 35.

70 100 parts by weight of the resulting estolide are then esterified with 10 parts by weight of polyglycerol ($N_d^{25} = 1.4808$) by heating in vacuo for 5 hours at 210°C, nitrogen at a reduced pressure being passed through during

the heating. The resultant product and the following constants:

$$\text{Acid value} = 1.2$$

$$N_d^{0.5} = 1.4648$$

- 5 If desired about 0.03% NaOH in the form of a 1N aqueous solution may be added to the ester.

The preparation of the monoacylglycerophosphatide

- 10 100 g of commercially available crude soya phosphatide (65% phosphatides, 35% oil) was vigorously stirred to an emulsion with 80 ml water and 20 ml of a suspension of 0.5% pancreatin in water. The mixture was stirred
15 for 20 hours at 55°C, after which the acid value calculated on the water-free product had increased from about 20 to 36. The aqueous suspension was dried under vacuum
20 at 60°C. A partially hydrolysed phosphatide product was obtained having an α -monoacylphosphatide content of about 12%.

The preparation of the margarines

- 25 To 400 g distilled water a partially hydrolysed phosphatide was added (10 g). (Example 1).

- To disperse the phosphatides at room temperature the pH of the water phase was brought with lye to 9. After the dispersing of the phosphatides the pH was reduced to 6 with
30 the aid of lactic acid. The aqueous phase had a milky appearance and no flocculation of phosphatides could be observed.

The aqueous phase obtained was dispersed in a refined fat phase consisting of 2000 g of sunflower oil containing 20 g of the partial ester. 35

The sunflower oil contained about 60% of linoleic acid calculated on the total quantity of fatty acids and it remained clear and pourable at -5°C and higher temperatures. The emulsion was prepared by dispersing the aqueous phase in the oil phase by means of an Ultra Turrax mixer (Type T 45) (Ultra Turrax is a registered Trade Mark) rotating at a velocity of 2000 r.p.m. 40 45

Similarly the margarine of example 2 was prepared except that now the monoacylglycerophosphatides were added together with the partial ester to the fat phase.

The oil exudation of samples of the liquid margarines obtained was assessed after the margarines had been kept at 30°C for 3 weeks in glass cylinders with a diameter of 3.7 cm and a volume of 250 ml. The cylinders were filled to a height of 10 cm. The oil exudation was expressed in mm. Further, the amount of concentrated emulsion was measured at the same time, which amount is also expressed in mm. The concentrated emulsion layer has a higher water content than the average water content of the pourable margarine and can be observed because of its more intense colour. Similarly the amount of free water was measured. 50 55 60

The results were:

65

	oil exudation mm	concentrated emulsion mm	free water mm
Liquid margarine of Example 1	5	8	<1
" " " " 2	5	20	none

- 70 These results show that both liquid margarines have an excellent stability. However, by incorporation of the monoacylglycerophosphatides in the aqueous phase instead of in the fatty phase of the pourable margarine, an even better stability is obtained.

EXAMPLES III—V.

Three liquid margarines were prepared as

described in Example I, using the same ingredients, except that further 0.2% of potassium oleate was added to the aqueous phase (example 3), 0.2% of common salt (example 4), or 0.2% of potassium oleate in the aqueous phase together with 0.2% of common salt (example 5). 75 80

The results are shown in Table 1.

TABLE I

Ex. No.	Oil exudation mm	Concentrated emulsion mm	Free water mm
3	5	6	<1
4	5	8	2
5	2	6	None

EXAMPLES VI—VIII.

Three liquid margarines were prepared as described in Example II using the same ingredients, except that further 0.2% of potassium oleate was added to the aqueous phase (Ex-

ample VI), 0.2% of common salt (Example VII) or 0.2% of potassium oleate in the aqueous phase together with 0.2% of common salt (Example VIII).

The results are shown in Table II.

-10

TABLE II

Ex. No.	Oil exudation mm	Concentrated emulsion mm	Free water mm
6	4	7	None
7	6	5	5
8	2	5	3

EXAMPLE IX.

Example I was repeated except that the 0.5% of enzymatically hydrolysed phosphatides in the aqueous phase were replaced by 0.2% of potassium oleate.

The results were:

Oil exudation (mm) : 6
 Concentrated emulsion (mm) : 5
 Free water (mm) : None

EXAMPLE X.

Example I was repeated except that no enzymatically hydrolysed phosphatides were added.

The results were:

Oil exudation (mm) : 5
 Concentrated emulsion (mm) : 15
 Free water (mm) : None

EXAMPLES XI—XIV.

The examples I, III, IV and V were repeated (examples XI, XII, XIII and XIV resp.) except that the 0.5% of enzymatically hydrolysed phosphatides were replaced by 0.5% of unhydrolysed phosphatides.

The results are shown in Table III

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TABLE III

Ex. No.	Oil exudation mm	Concentrated emulsion mm	Free water mm
11	4	8	<1
12	4	None	<1
13	4	8	<1
14	3	6	None

EXAMPLES XV—XXV.

Pourable margarines were prepared as described in Example I containing 1% of the partial ester prepared as described in Example I in the fatty phase. The aqueous phase, however, contained:

Example XV	No additive
10 " XVI	2% common salt (calculated on the margarine)
" XVII	2.0% of the aqueous phase of enzymatically hydrolysed phosphatides
15 " XVIII	0.2% of the aqueous phase of potassium oleate
" XIX	2.0% of the aqueous phase of enzymatically hydrolysed phosphatide together with 1% of common salt (calculated on the margarine)
20 " XX	2.0% of the aqueous phase of enzymatically hydrolysed phosphatide together with 2% of common salt (calculated on the margarine)
25 " XXI	0.2% of the aqueous phase of potassium oleate together with 1% of common salt (calculated on the margarine)
30	

" XXII	0.2% of the aqueous phase of potassium oleate together with 2% of common salt (calculated on the margarine)	35
" XXIII	0.2% of potassium oleate together with 2.0% of enzymatically hydrolysed phosphatide	40
" XXIV	as Example XXIII with 1% of common salt (calculated on the margarine)	45
" XXV	as Example XXIII with 2% of common salt (calculated on the margarine)	

The enzymatically hydrolysed phosphatide was prepared as described in Example I. 50

In each example three margarines were prepared from an aqueous phase consisting of a 50:50 mixture of distilled water and skim milk (Example XV A, etc.), a 50:50 mixture of tap water and skim milk (Example XV B, etc.), or of tap water (Example XV C, etc.). 55

The tap water used was of a hardness of 15 degrees German Hardness.

The margarines prepared were stored for 4 days at 35°C and the oil exudation was determined as described in Example I. 60

The results are compiled in Table IV

TABLE IV

Ex. No.	Oil exudation mm		
	50 skim milk 50 distilled water	50 tap water 50 skim milk	Tap water
	A	B	C
15	50	18	<5
16	50	19	<5
17	< 5	< 5	<5
18	20	10	<5
19	< 5	< 5	<5
20	< 5	< 5	<5
21	30	40	<5
22	20	13	<5
23	< 5	< 5	<5
24	< 5	< 5	<5
25	< 5	< 5	<5

From Table IV it follows that excellent pourable margarines containing the surface-active agent can be prepared from a tap aqueous phase. If a considerable proportion of skim milk is present in the aqueous phase it is of advantage to have also a hydrophobic emulsifier, especially monoacylglycerophosphatides, therein.

Results similar to those of the previous examples 1—25 are obtained if, instead of a fatty phase consisting of sunflower oil, other fatty oils are used in the fatty phase, e.g. safflower, soybean, corn oil, groundnut, cottonseed, etc. Also other surface-active agents can be used, e.g. those mentioned in examples 3 and 5 of British patent specification 723,244 without detrimentally affecting the excellent stability properties of the liquid margarines of the invention.

EXAMPLE XXVI.

Example XXIV B was repeated, except that 2.5% of fatty hydrogenated rapeseed oil of a melting point of 70°C. was added to the sunflower oil. Only very little destabilisation due to oil exudation could be observed after 14 days' storage at 35°C.

When this experiment was repeated with 0.5 and 1.5% of hydrogenated rapeseed oil more than 1 cm concentrated emulsion was detected within one day after storage at 35°C.

EXAMPLE XXVII.

Example XXIV B was repeated, except that 35% of whey powder was added to the fat phase.

No influence on the emulsion stability could be observed. A gravy prepared from this margarine had a more intense brown colour than a gravy prepared from the margarine of example XXIV B.

WHAT WE CLAIM IS:—

1. Pourable margarine, comprising 10 to 25% by weight of an aqueous phase and 90 to 75% by weight of a fatty phase, said fatty phase comprising a liquid oil which is pourable at all temperatures from 5—35°C and 0.5 to 2.5% by weight of the fatty phase of a surface-active agent prepared by reacting 80—92 parts by weight of a polycondensed aliphatic hydroxy-monocarboxylic acid initially having 11 to 20 carbon atoms, which polycondensate has an acid number not in excess of 70, with 1—20 parts by weight of a polycondensed aliphatic polyhydric alcohol initially having 3 to 5 carbon atoms, at a temperature in the range of 180°C to 210°C, until the acid value of the reaction mixture drops to below 10.

2. Pourable margarine according to claim 1, in which the liquid oil is pourable at all temperatures from 0—35°C.

3. Pourable margarine according to claim

- 1 or 2, in which further a hydrophilic emulsifier is present.
4. Pourable margarine according to claim 3, in which the hydrophilic emulsifier is present in the aqueous phase.
- 5 5. Pourable margarine according to claim 3 or 4, in which the hydrophilic emulsifier is a sodium or potassium salt of oleic acid.
- 10 6. Pourable margarine according to claim 3 or 4, in which the hydrophilic emulsifier is a phosphatide.
- 15 7. Pourable margarine according to claim 6, in which the phosphatide contains from 5—35% by weight of a monoacylglycerophosphatide.
8. Pourable margarine according to any one of the preceding claims, in which from 0.75 to 1.5% by weight of the fatty phase of surface-active agent is used.
- 20 9. Pourable margarine according to any of claims 3—8, in which from 0.3 to 6% by weight of the aqueous phase of the hydrophilic emulsifier is used.
- 25 10. Pourable margarine according to claim 9, in which from 0.5 to 3.5% by weight of the aqueous phase of the hydrophilic emulsifier is used.
11. Pourable margarine according to claim 9 or 10, in which from 1.5—2.5% of monoacylglycerophosphatides and 0.1 to 0.5% of potassium oleate by weight of the aqueous phase of the hydrophilic emulsifier is used.
- 30 12. Pourable margarine according to any of the preceding claims, in which an aqueous phase is used containing, apart from various minor ingredients, a substantial proportion of water.
- 35 13. Pourable margarine according to claim 12, in which the aqueous phase contains from 50—100% of water.
- 40 14. Pourable margarine, substantially as hereinbefore described with particular reference to any of the examples.
- 45 15. Foodstuffs comprising or prepared with the pourable margarine substantially as hereinbefore described with particular reference to any of the examples.

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